

Package ‘DTDA.ni’

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Title Doubly Truncated Data Analysis, Non Iterative

Version 1.0.1

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Description

Non-iterative estimator for the cumulative distribution of a doubly truncated variable. de Uña-Álvarez J. (2018) <[doi:10.1007/978-3-319-73848-2_37](https://doi.org/10.1007/978-3-319-73848-2_37)>.

Depends R (>= 3.3.0)

License GPL-2

Encoding UTF-8

RoxygenNote 7.1.2

Suggests knitr, rmarkdown

VignetteBuilder knitr

URL <https://github.com/sidoruvigo/DTDA.ni>

NeedsCompilation no

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Repository CRAN

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DTDA.ni-package *Package ‘DTDA.ni’*

Description

Non-iterative estimator for the cumulative distribution of a doubly truncated variable, see de Uña-Álvarez (2018). Restricted to interval sampling.

Details

Documentation for package ‘DTDA.ni’ version 1.0

- Package: DTDA.ni
- Version: 1.0
- Maintainer: José Carlos Soage González <jsoage@uvigo.es>
- License: GPL-2

Value

- DTDAni: Implements a non-iterative estimator for the cumulative distribution of a doubly truncated variable
- plot.DTDAni: S3 method to plot a DTDAni object by using the generic plot function.

Acknowledgements

- Jacobo de Uña-Álvarez was supported by Grant MTM2014-55966-P, Spanish Ministry of Economy and Competitiveness.
- José Carlos Soage was supported by Red Tecnológica de Matemática Industrial (Red TMATI), Cons. de Cultura, Educación e OU, Xunta de Galicia (ED341D R2016/051) and by Grupos de Referencia Competitiva, Consolidación y Estructuración de Unidades de Investigación Competitivas del SUG, Cons. de Cultura, Educación e OU, Xunta de Galicia (GRC ED431C 2016/040).

Author(s)

- de Uña-Álvarez, Jacobo.
- Soage González, José Carlos.

References

de Uña-Álvarez J. (2018) A Non-iterative Estimator for Interval Sampling and Doubly Truncated Data. In: Gil E., Gil E., Gil J., Gil M. (eds) The Mathematics of the Uncertain. Studies in Systems, Decision and Control, vol 142. Springer, Cham, pp. 387-400.

See Also

Useful links:

- <https://github.com/sidoruvigo/DTDA.ni>

DTDA*ni*
Doubly Truncated Data Analysis, Non Iterative

Description

This function computes a non-iterative estimator for the cumulative distribution of a doubly truncated variable, see de Uña-Álvarez (2018). The function is restricted to interval sampling.

Usage

```
DTDAni(x, u, tau)
```

Arguments

x	Numeric vector corresponding the variable of ultimate interest.
u	Numeric vector corresponding to the left truncation variable.
tau	Sampling interval width. The right truncation values will be internally calculated as $v = u + \text{tau}$.

Details

The function DTDA*ni* is adapted to the presence of ties. It can be used to compute the direct (Fd) and the reverse (Fr) estimators; see the example below. Both curves are valid estimators for the cumulative distribution (F) of the doubly truncated variable. Weighted estimators $Fw = w * Fd + (1 - w) * Fr$ with $0 < w < 1$ are valid too, the choice $w = 1/2$ being recommended in practice (de Uña-Álvarez, 2018).

Value

A list containing:

x	The distinct values of the variable of interest.
nx	The absolute frequency of each x value.
cumprob	The estimated cumulative probability for each x value.
P	The auxiliary P_i used in the calculation of the estimator.
L	The auxiliary L_i used in the calculation of the estimator.

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Examples

```
## Not run:
# Generating data which are doubly truncated:
N <- 250
x0 <- runif(N)           # Original data
u0 <- runif(N, -0.25, 0.5) # Left-truncation times
tau <- 0.75             # Interval width
v0 <- u0 + tau

x <- x0[u0 <= x0 & x0 <= v0]
u <- u0[u0 <= x0 & x0 <= v0]
v <- v0[u0 <= x0 & x0 <= v0]
n <- length(x) # Final sample size after the interval sampling

# Create an object with DTDAni function
res <- DTDAni(x, u, tau)
plot(res)

abline(a = 0, b = 1, col = "green") #the true cumulative distribution

# Calculating the reverse estimator:
res2 <- DTDAni(-x, -u - tau, tau)
lines(-res2$x, 1 - res2$cumprob, type = "s", col = "blue", lty = 2)

# Weigthed estimator (recommended):
w <- 1/2
```

```

k <- length(res$x)

Fw <- w * res$cumprob + (1 - w) * (1 - res2$cumprob[k:1])
lines(res$x, Fw, type = "s", col = 2)

# Using res$P and res$L to compute the estimator:

k <- length(res$x)
F <- rep(1, k)
for (i in 2:k){
  F[i] <- (F[i - 1] - res$P[i - 1]) / res$L[i - 1] + res$P[i - 1]
}

F0 <- F/max(F) # This is equal to res$cumprob

## End(Not run)

```

plot.DTDAni

plot.DTDAni

Description

S3 method to plot a DTDAni object by using the generic plot function.

Usage

```

## S3 method for class 'DTDAni'
plot(x, ecdf = FALSE, ...)

```

Arguments

x	DTDAni object.
ecdf	Whether to display the ordinary empirical cumulative distribution function or not. Default = FALSE.
...	Additional parameters.

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tau <- 0.75             # Interval width
v0 <- u0 + tau

x <- x0[u0 <= x0 & x0 <= v0]
u <- u0[u0 <= x0 & x0 <= v0]
v <- v0[u0 <= x0 & x0 <= v0]
n <- length(x) # Final sample size after the interval sampling
res <- DTDAni(x, u , tau)
plot(res)
plot(res, ecdf = TRUE)

## End(Not run)
```

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